

SHORTER CONTRIBUTIONS

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SPRING DRAGONFLY (ODONATA) AND BUTTERFLY (LEPIDOPTERA) FALLOUT AT THE CHESAPEAKE BAY BRIDGE-TUNNEL.—Large groups of migrating Odonata are rare, especially in spring (Russell et al., 1998). On 27 May 2000, from about 1530 h to 1630 h, I encountered a fallout, or mass grounding, of dragonflies, butterflies, and other insects on the Chesapeake Bay Bridge-tunnel, at the mouth of Chesapeake Bay. The “other” insects were mostly beetles and were not studied. A thunderstorm was rapidly approaching, that soon produced heavy rain, causing me to leave after making observations on the three northernmost of four total man-made islands. The temperature was about 32° C and humidity was near 100%. Winds were moderate from the east and had been strong, from the east, off the ocean, for the previous two days.

I am a volunteer bird and butterfly researcher for Coastal Virginia Wildlife Observatory and while the Observatory has conducted regular butterfly surveys at the tip of Virginia's Eastern Shore since 1995, dragonfly study has been very limited. The bridge-tunnel is a well-known migrant bird trap at all seasons (Kain & Brinkley, 1997) and I have crossed it regularly throughout the year for more than 25 years and have not witnessed a similar insect fallout there.

I am not a dragonfly expert, but I am familiar with many species. I made sketches and notes of the dragonflies that were perched on the building walls and could be examined closely. I later made my identifications using Dunkle (2000) and the dragonfly website at <http://members.bellatlantic.net/~dbarber/odonatology.html>. I counted more than 500 dragonflies on the 10 m by 10 m brick south wall of the building on the next to southernmost island. Many appeared to be escaping the strong wind by resting on the walls, but others were flying or were perched on vegetation out in the open. I estimated a total of 4,500 dragonflies over a distance of about 13 km along the bridge-tunnel.

Although I must have missed some species due to limited study time, nine species of dragonflies were identified. Estimates of the percentage of each species, made mainly from the close observations of those perched on the walls, are in Table 1. I was able to confirm the presence of both males and females for *Anax junius*, *Pachydiplax longipennis*, *Gomphaeschna furcillata*, *Erythemis simplicicollis*, and *Libellula vibrans*.

Table 1. Dragonflies recorded during fallout on 27 May 2000 at the Chesapeake Bay Bridge-tunnel.

Common Name	Scientific Name	Estimated % of Total
Common Green Darner	<i>Anax junius</i>	25
Eastern Pondhawk	<i>Erythemis simplicicollis</i>	25
Harlequin Darner	<i>Gomphaeschna furcillata</i>	10
Blue Dasher	<i>Pachydiplax longipennis</i>	10
Great Blue Skimmer	<i>Libellula vibrans</i>	10
Swamp Darner	<i>Epiaeschna heros</i>	10
Halloween Pennant	<i>Celithemis eponina</i>	5
Eastern Amberwing	<i>Perithemis tenera</i>	5
Saddlebags sp.	<i>Tramea</i> sp.	<1

I roughly estimated butterfly numbers at several hundred. They were common species that I am familiar with, however, because of the impending storm and my interest in the dragonflies, time was not taken to differentiate Clouded from Orange Sulphur nor Question Mark from Comma nor American Lady from Painted Lady. The list of butterflies identified with estimates of the percentage of each species seen is contained in Table 2.

Table 2. Butterflies recorded during fallout on 27 May 2000 at the Chesapeake Bay Bridge-tunnel.

Common Name	Scientific Name	Estimated % of Total
Clouded/Orange	<i>Colias philodice</i> /	25
Sulphur	<i>C. eurytheme</i>	
Red Admiral	<i>Vanessa atalanta</i>	25
Common Buckeye	<i>Junonia coenia</i>	25
American/Painted	<i>Vanessa virginiensis</i> /	10
Lady	<i>V. cardui</i>	
Comma/	<i>Polygonia comma</i>	10
Question Mark	<i>P. interrogationis</i>	
American Snout	<i>Libytheana carinenta</i>	5

On 3 June 2000, I visited the bridge-tunnel again and found dozens of dragonflies still present, though many were sluggish and could be captured by hand. I was able to measure and photograph several species. The Internet site for the North American Dragonfly Migration Project (<http://members.bellatlantic.net/~dbarber/migrant/mig.html>) described, with moving graphics, a “frontal boundary and radar visible migration” along the East Coast on 3 June 2000.

Possible reasons for mass migrations of dragonflies in spring include dispersal from drought-affected areas, sustained southerly winds, and population increases. These movements may not be annual events and probably vary greatly in magnitude (Soltesz et al., 1995).

LITERATURE CITED

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RECORDS FOR WINTER SCORPIONFLIES IN VIRGINIA (MECOPTERA: BOREIDAE).--Although the great majority of mecopterans are active as adults during the warmer months of the year, there is a small and hardy contingent, species of the family Boreidae, which has become adapted to life during the cold winter periods and may even be found walking actively on snow. This seasonal preference has resulted in a group of insects somewhat less well known than their thermophilus relatives, and even the details of their geographic distribution remain to be worked out. Knowledge of this family was summarized several decades ago (Penny, 1977) in a useful and complete monograph, which serves as a baseline upon which local studies can be superimposed. Penny recognized ten Nearctic species of the major genus *Boreus*, of

which only two occur in the eastern states, and provided distributional maps which reflected the paucity of museum material available to him at the time. Although it is understandable that traditional hand-capture methods have not been extensively employed, the scarcity of Virginia records is surprising, considering that pitfall trap lines have been operated throughout the year at localities across the state including White Top Mountain. The following is a summary of known Virginia records based on literature and material in the Virginia Museum of Natural History (VMNH, identifications by G. W. Byers) and the National Museum of Natural History (USNM, identifications by O. S. Flint).

Boreus brumalis (Fitch). The main body of this species' range extends from Ontario and Maine west through Michigan and Ohio and south to the Great Smoky Mountains, Tennessee, with disjunct outlying segments in Minnesota, Wisconsin, and Illinois. There appear to be no published localities for the relatively well-collected states of Arkansas (Robison et al., 1997) and Kentucky (Byers & Covell, 1981). Byers (1962) published a record for Quantico, Prince William County, Virginia. Penny (1977) plotted only two Virginia records, including the foregoing and another in Giles County, presumably at or near Mountain Lake.

New Virginia records are: *Arlington Co.*: Arlington, 11 December 1960, A. B. Gurney (USNM 2). *Augusta Co.*: George Washington National Forest (GWNF), timber management compartment 460-5, ca. 5 mi W Stokesville, 18 May 1988, Barry D. Flamm (VMNH 1), same site and collector, 22 December 1988 (VMNH 1). Shenandoah Mountain, 5 mi S Reddish Knob on FS Rt. 85, 17 June 1988, Kurt A. Buhlmann (VMNH 1); same site and collector, 19 November 1988 (VMNH 1). *Fairfax Co.*: Dead Run, on snow, 20 January 1957, A. B. Gurney (USNM 2); Falls Church, on snow, 18 December 1957, A. B. Gurney (USNM 1); River Bend Park, Great Falls, 2 January 1955, G. B. Vogt (USNM 1). *Loudoun Co.*: Appalachian Trail near Round Hill, 8 February 1970, O. S. Flint, Jr. (USNM 16). *Page Co.*: Mountain Run, base of Strickler Knob, ca. 5 mi W Luray, 9 February 1975, O. S. Flint, Jr. (USNM 6). *York Co.*: Yorktown Naval Weapons Station, 4 April 1991, Kurt A. Buhlmann (VMNH 1).

Most of these records are consistent with the known range of this boreal, psychrophilic insect. That for York County is a little more southward and lowland than might have been expected, but Prof. Byers advises (*in litt.*) that he found the species in some numbers on snow in Rock Creek Park, District of Columbia. Presumably, *B. brumalis* occurs in much of Virginia, but pitfall trapping is probably not the optimal technique for collecting this species.